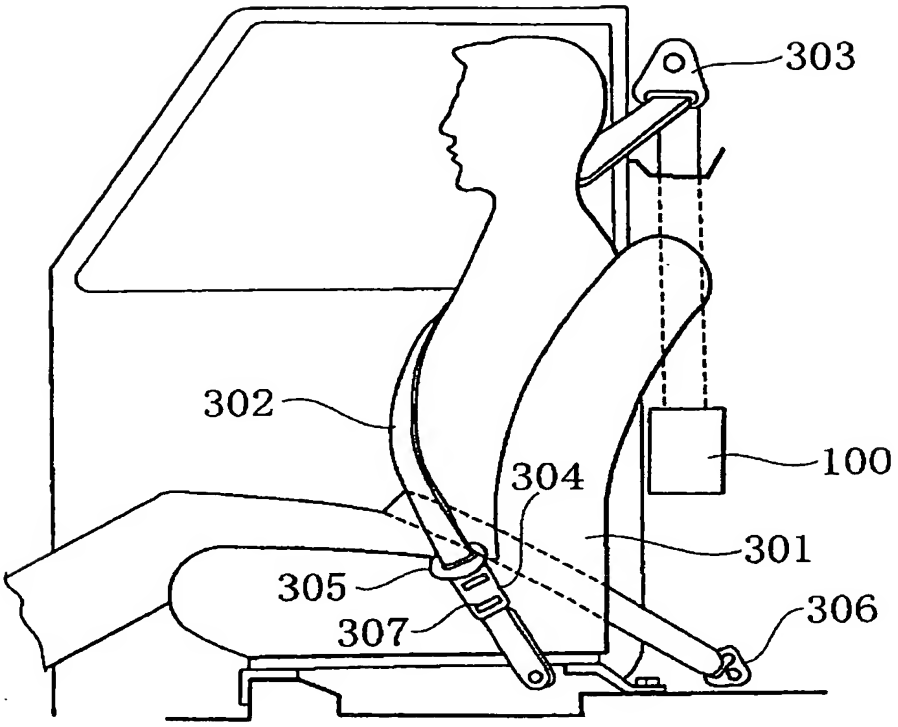
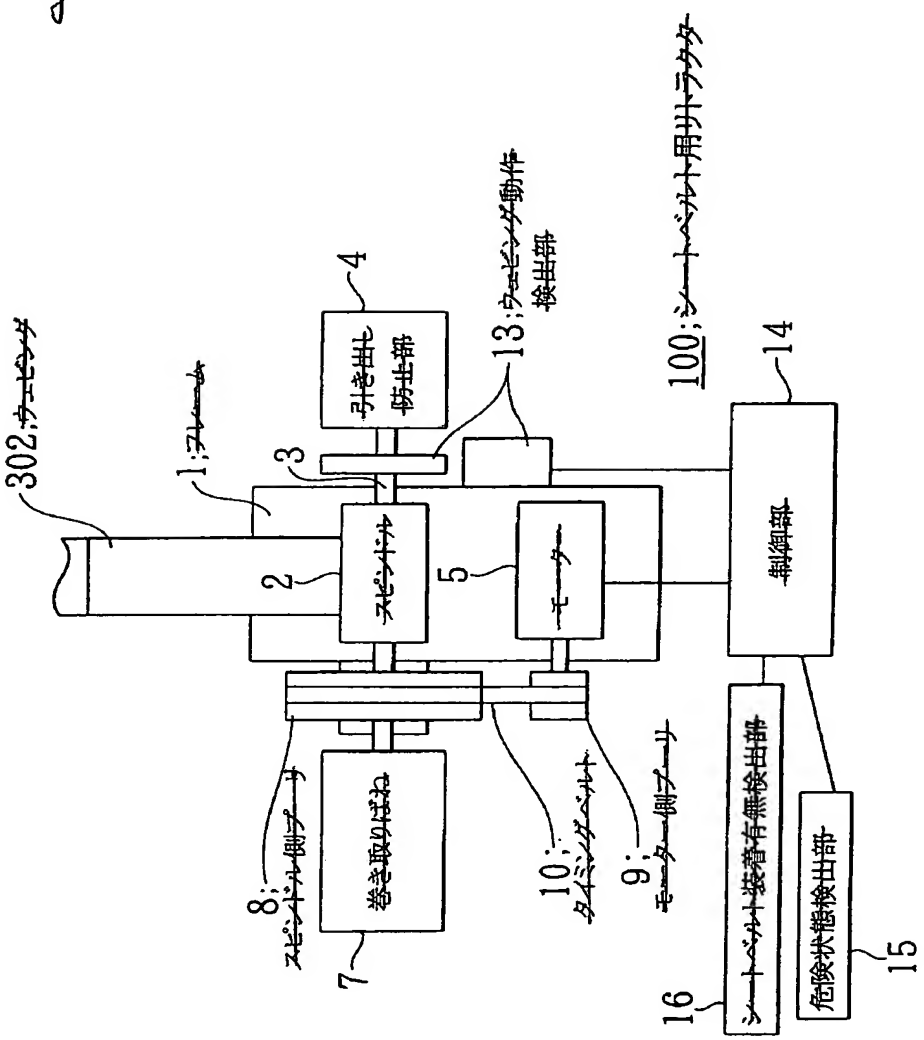
~~第1図~~

Fig. 1

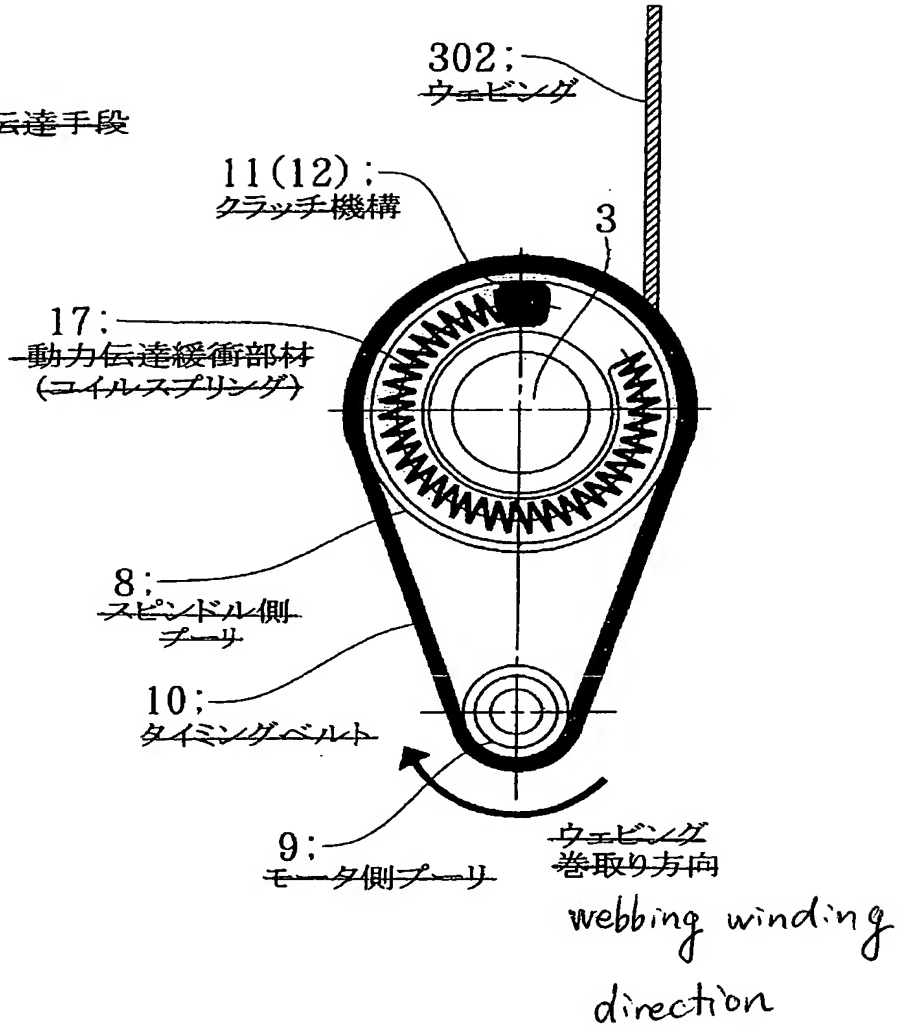


~~第2図~~

Fig. 2

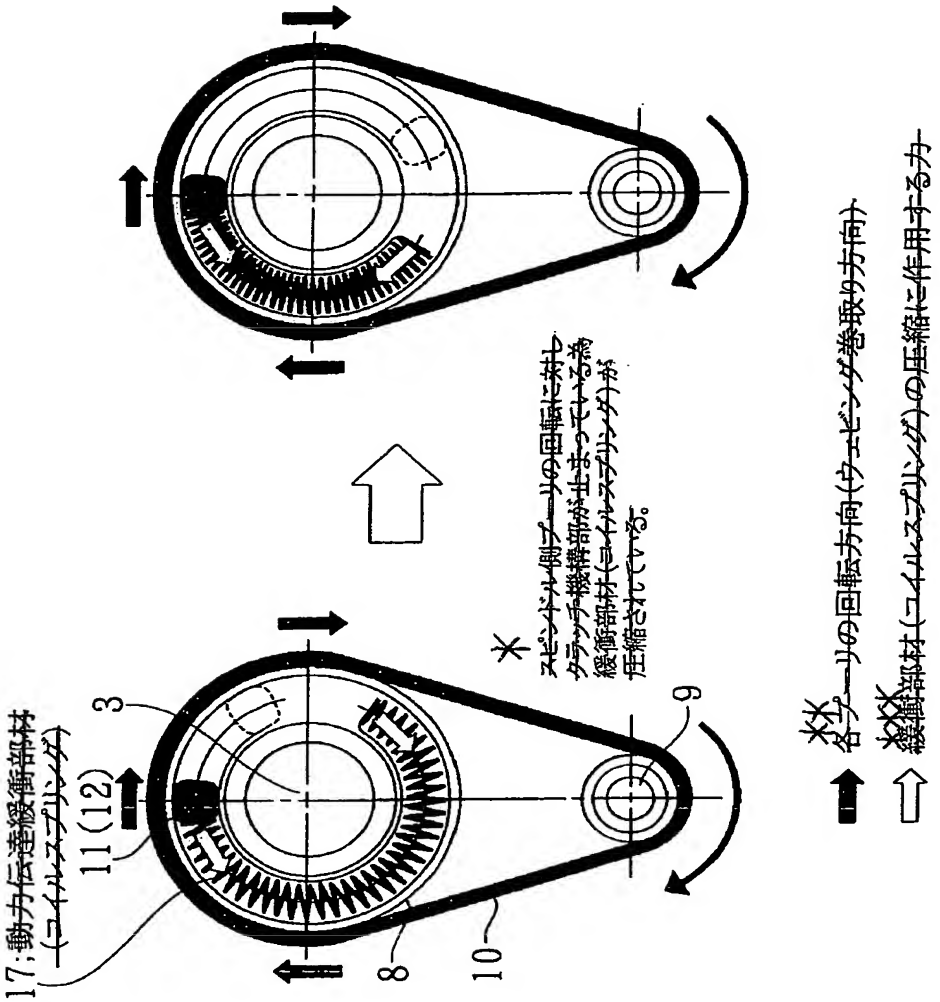

302;ケーブル
1;フレーム
2
スピンドル
3
4
引き出し防止部
5
モーター
13;ケーブル巻き動作検出部
100;シートベルト用リトラクター
14
制御部
巻き取りばね
7
8;スピンドル側ブーリ
10;タイミングベルト
9;モーター側ブーリ
16
シートベルト装着有無検出部
危険状態検出部
15

~~第3図~~
Fig. 3


302;
ウェビング
6;動力伝達手段
11(12);
クラッチ機構
3
17;
動力伝達緩衝部材
(コイルスプリング)
8;
スピンドル側
プーリ
10;
タイミングベルト
9;
モータ側プーリ
ウェビング
巻取り方向
webbing winding
direction

~~第4図~~

Fig. 4



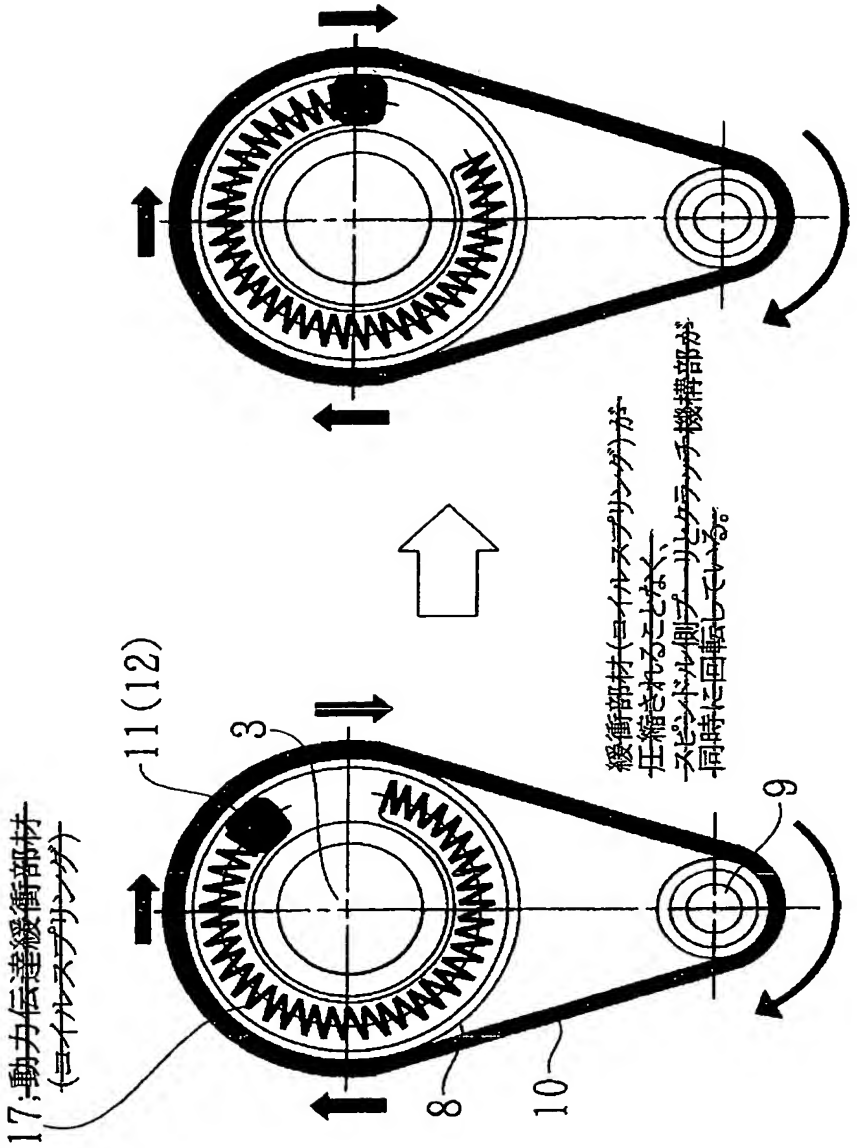
* Since the clutch mechanism is stopped with respect to a rotation of the spindle side pulley, the cushion member (coil spring) is compressed.

** Rotary direction of each pulley (webbing winding direction)

*** Force for compressing cushion member (coil spring)

~~第5図~~

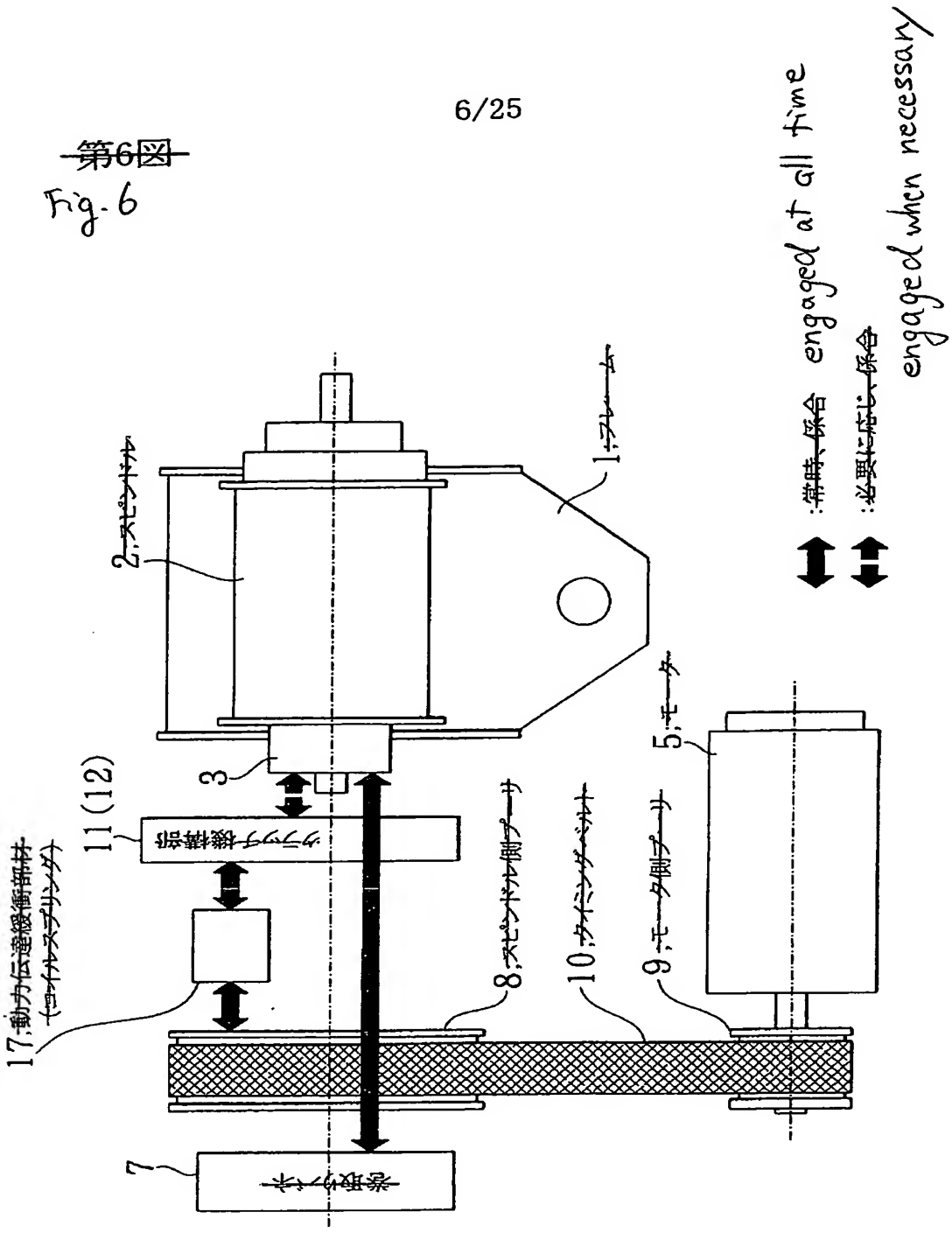
Fig-5



While the cushion member (coil spring) is not being compressed, the spindle side pulley and the clutch mechanism section are simultaneously rotated.

~~第6図~~

Fig. 6


常時係合 engaged at all time
必要に応じ係合 engaged when necessary
1;フレーム
2;スピンドル
3
11(12)
クランク機構部
17;動力伝達緩衝部材
(ライトスプリング)
8;スピンドル側ブーリ
10;タイミングベルト
9;モータ側ブーリ
5;モータ
7
巻取りドラム

~~第7図~~

Fig. 7

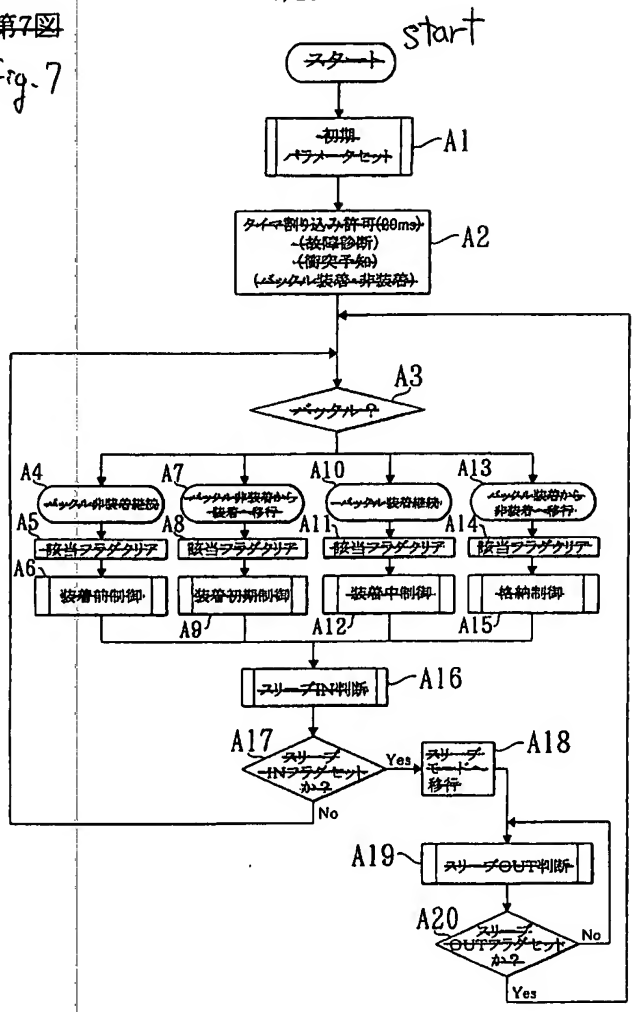


Fig. 7

A1 Set initial parameters

A2 Allow timer interruption (20 ms)

(Diagnosis of malfunction)

(Prediction of collision)

(Fastening buckle • not-fastening buckle)

A3 Buckle ?

A4 Continuation of not-fastening buckle

A5 Clear corresponding flag

A6 Prior fastening control

A7 Change from not-fastening buckle state to fastening buckle state

A8 Clear corresponding flag

A9 Initial fastening control

A10 Continuation of fastening buckle

A11 Clear corresponding flag

A12 Control during fastening

A13 Change from fastening buckle state to not-fastening buckle state

A14 Clear corresponding flag

A15 Control in accommodation

A16 Sleep IN judgment

A17 Is sleep IN flag set ?

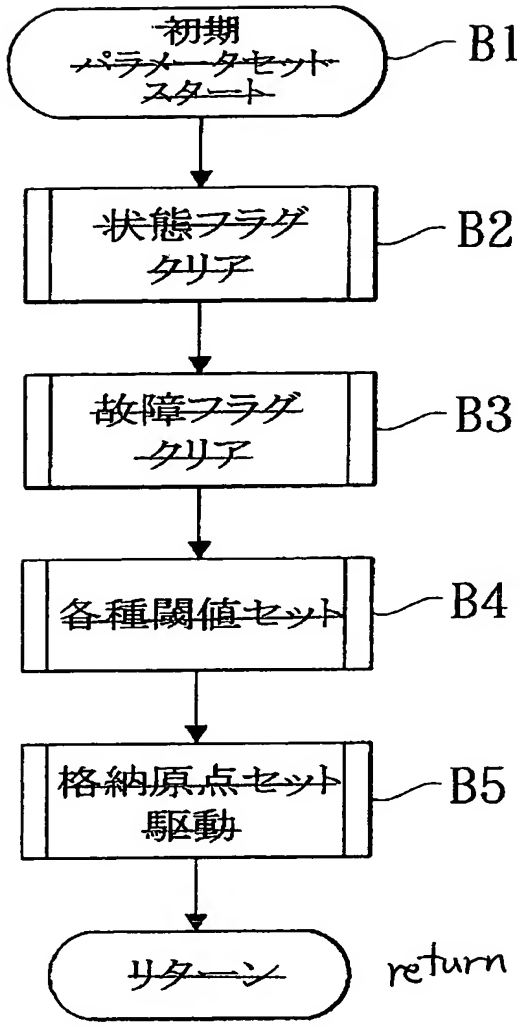
A18 Transfer to sleep mode.

A19 Sleep OUT judgment

A20 Is sleep OUT flag set ?

~~第8図~~

Fig.8



B1 Start setting initial parameters.

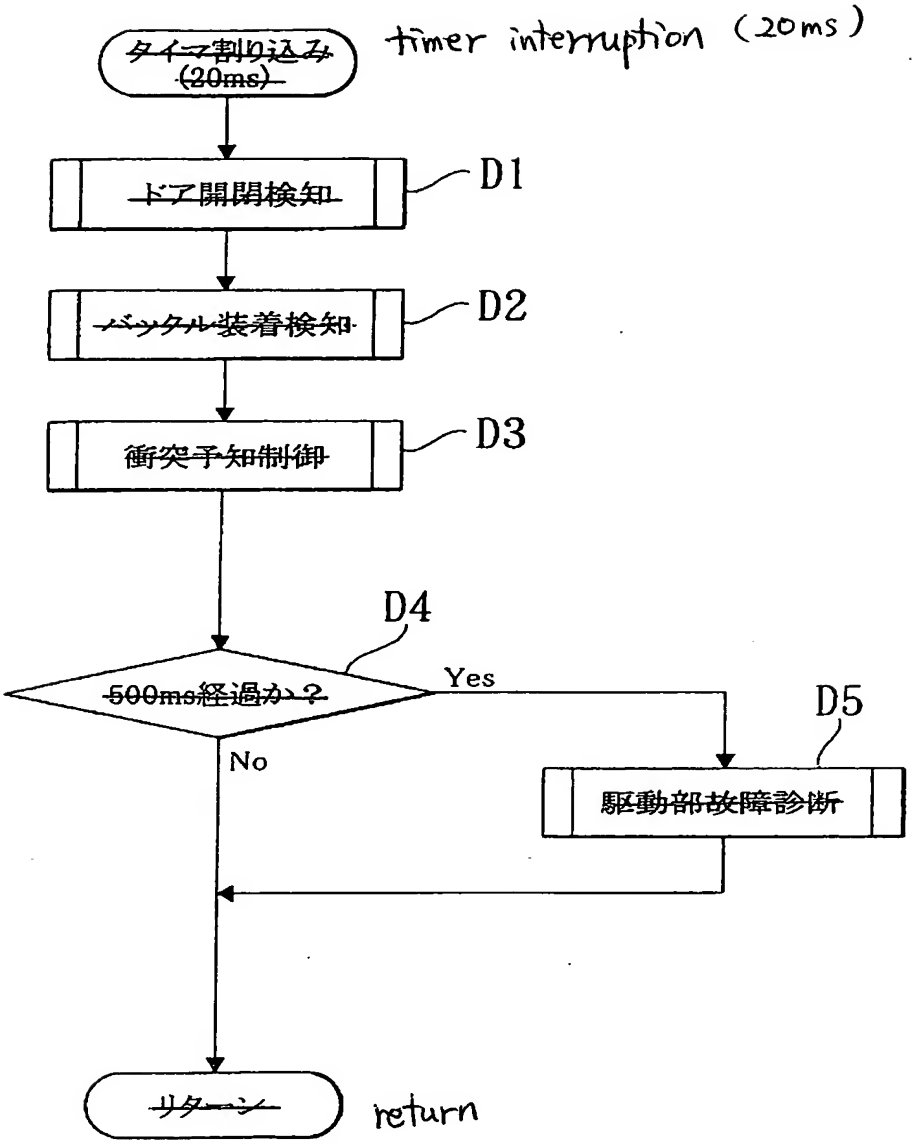
B2 Clear state flag.

B3 Clear malfunction flag.

B4 Set various threshold values.

B5 Set accommodation origin and drive.

~~第9図~~ Fig. 9



D1 Detect opening and closing door.

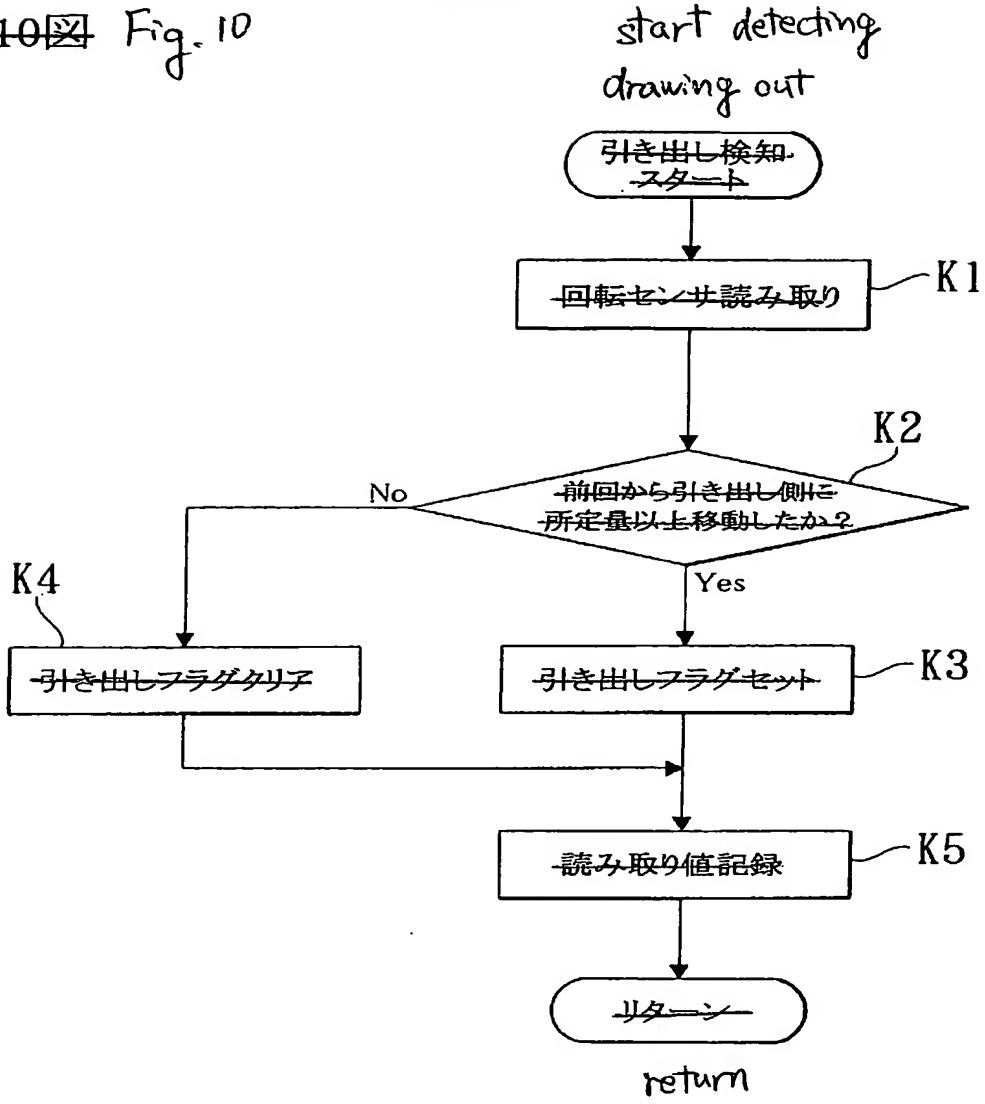
D2 Detect fastening buckle.

D3 Control predicting collision.

D4 Has the time of 500 ms passed ?

D5 Diagnosis of malfunction of drive section

~~第10図~~ Fig. 10



K1 Read out rotary sensor.

K2 Has webbing moved to drawing side by predetermined amount or more compared with amount of drawing of webbing of the last time ?

K3 Set drawing flag.

K4 Clear drawing flag.

K5 Record value read out.

Fig. 11

第11図

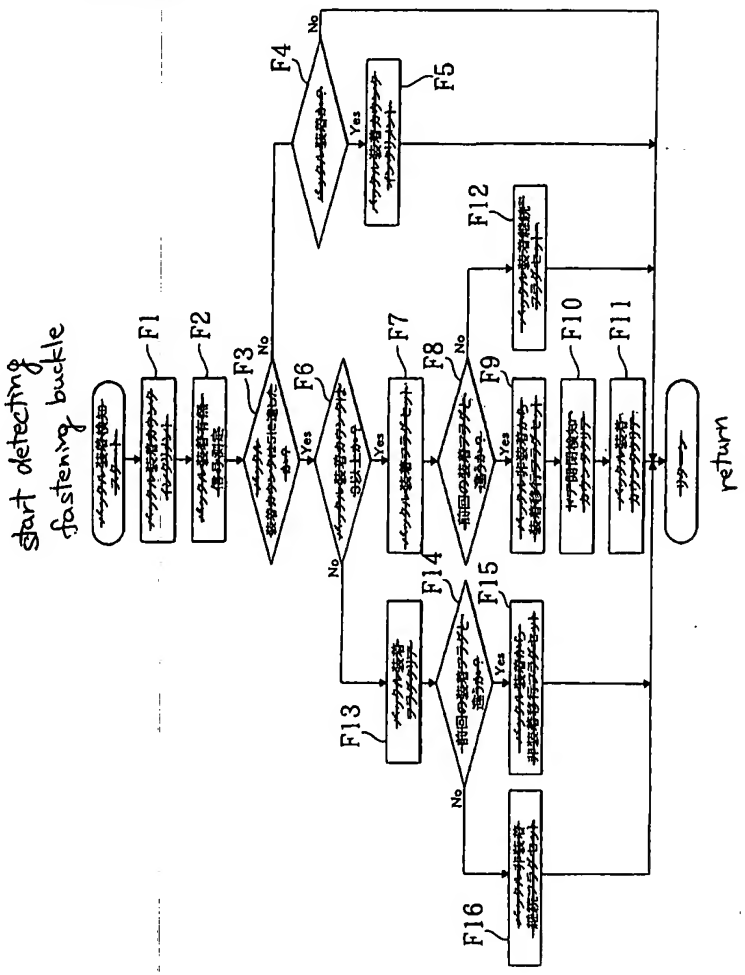


Fig. 11

F1 Make increment of buckle fastening counter.

F2 Measure signal of fastening buckle.

F3 Has buckle fastening counter reached 5 ?

F4 Is buckle worn ?

F5 Make increment of buckle fastening counter.

F6 Is buckle fastening counter 3 or more ?

F7 Set buckle fastening flag.

F8 Is it different from fastening flag of last time ?

F9 Set flag of transfer from not-fastening of buckle to fastening of buckle.

F10 Clear counter of detecting opening and closing door.

F11 Clear counter of fastening buckle.

F12 Set flag of continuation of fastening buckle.

F13 Clear flag of fastening buckle.

F14 Is it different from flag of fastening of last time ?

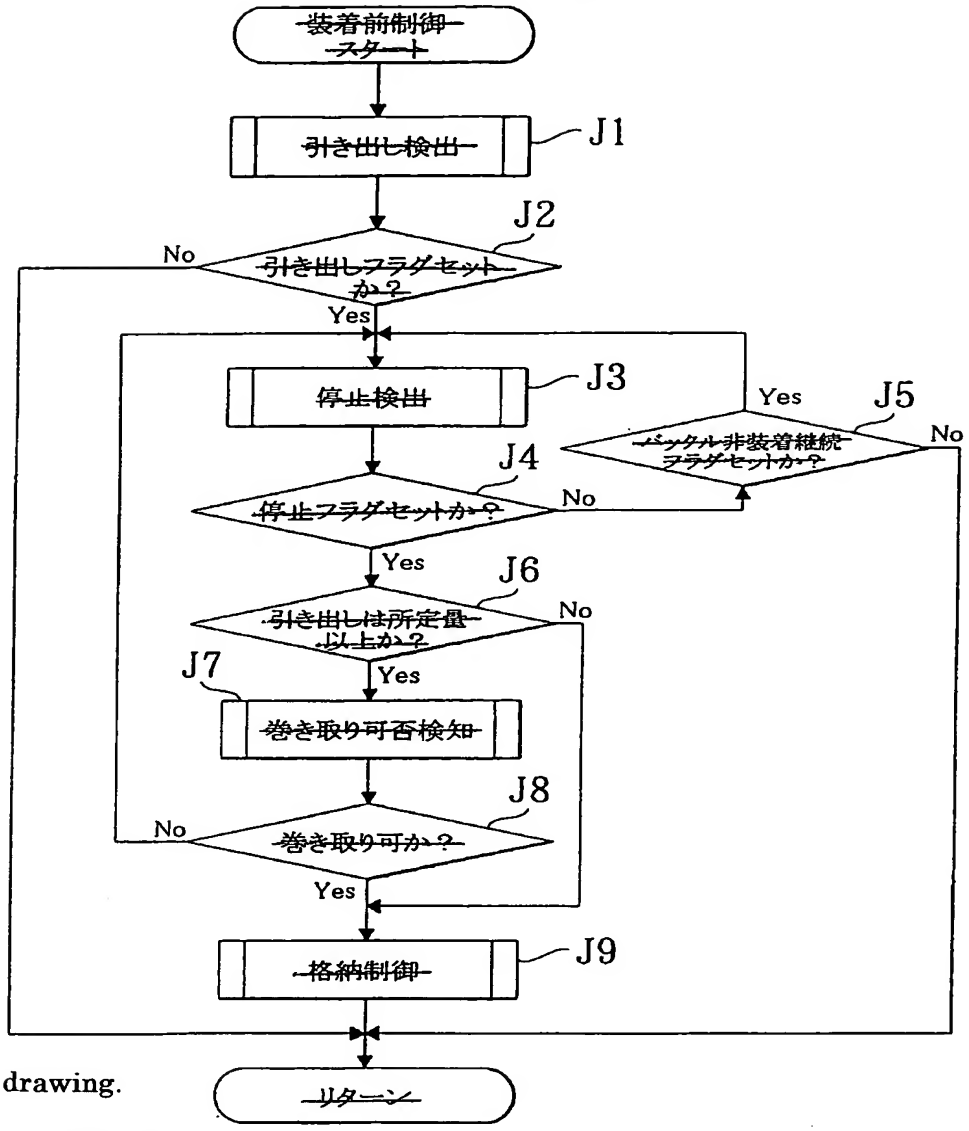
F15 Set flag of transfer from fastening of buckle to not-fastening of buckle.

F16 Set flag of continuation of not-fastening buckle.

Fig.12

~~第12図~~

start prior fastening control



return

J1 Detect drawing.

J2 Is drawing flag set ?

J3 Detect stoppage.

J4 Is stoppage flag set ?

J5 Is flag of continuation of not-fastening of buckle set ?

J6 Is drawing a predetermined amount or more ?

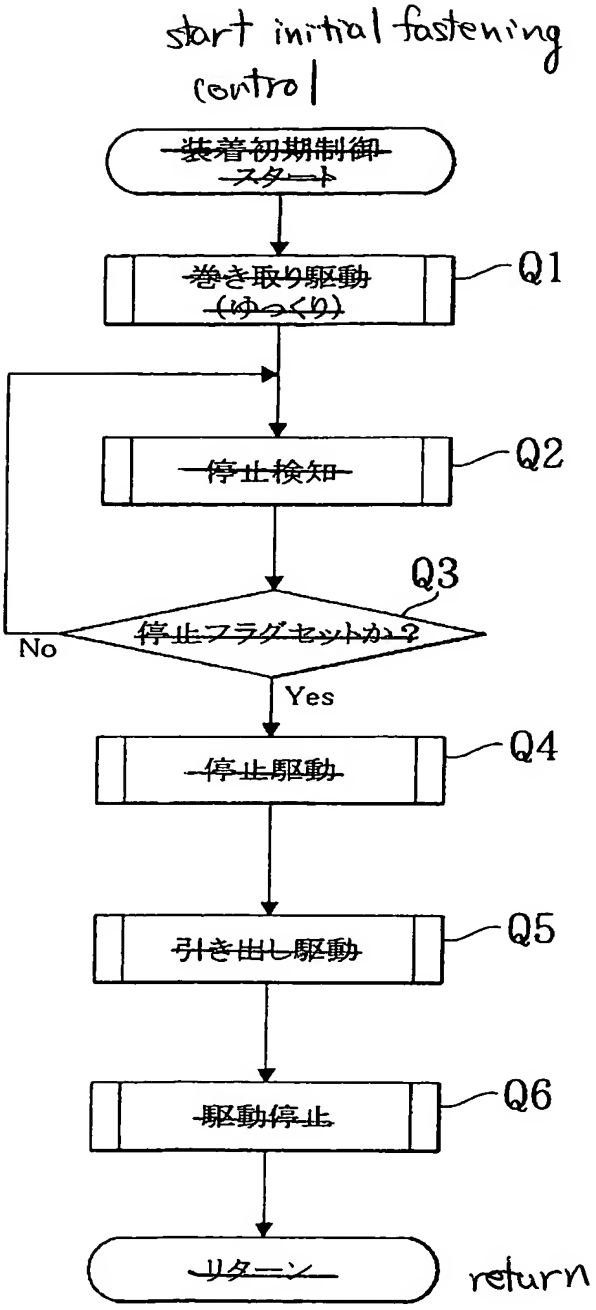
J7 Detect suitableness of winding.

J8 Is it suitable to wind ?

J9 Control in accommodation.

~~第13図~~

Fig. 13



Q1 Wind (slowly).

Q2 Detect stoppage.

Q3 Is stoppage flag set ?

Q4 Drive of stoppage.

Q5 Drive of drawing.

Q6 Stoppage of drive.

Frg. 14

~~第14図~~

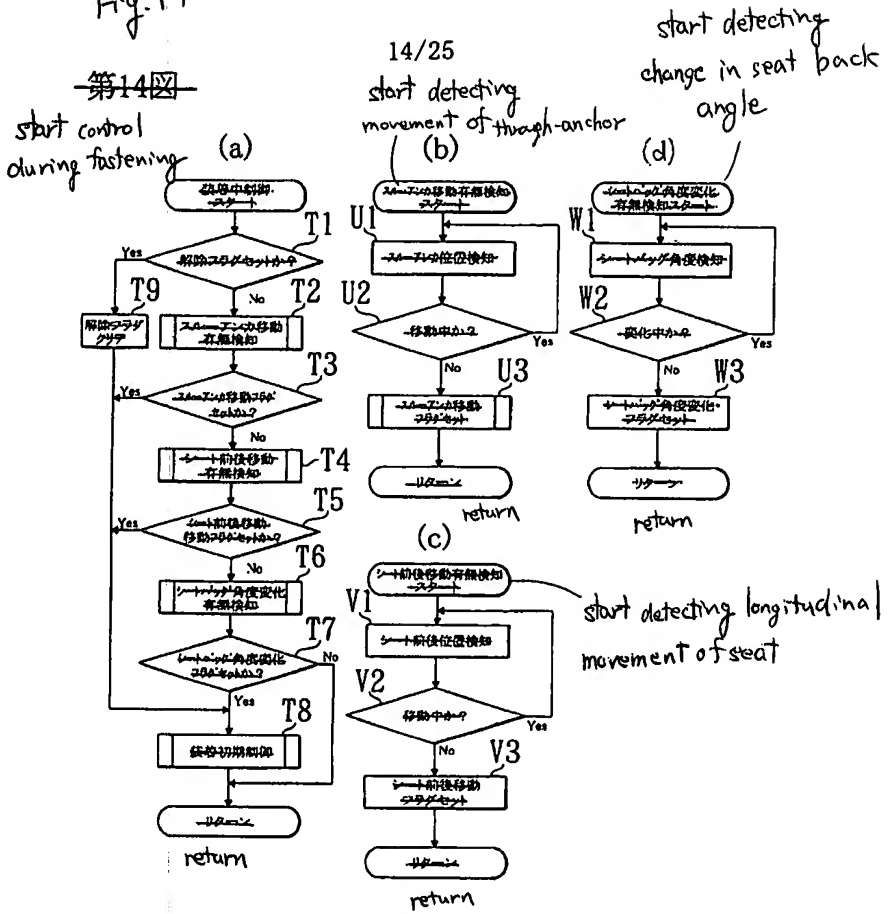


Fig. 14(a)

T1 Is release flag set ?

T2 Detect movement of through-anchor.

T3 Is through-anchor movement flag set ?

T4 Detect longitudinal movement of seat.

T5 Is flag of longitudinal movement of seat set ?

T6 Detect change in seat back angle.

T7 Is flag of change in seat back angle set ?

T8 Control of fastening at initial stage.

T9 Clear release flag.

Fig. 14(b)

U1 Detect position of through-anchor.

U2 Is it moving ?

U3 Set flag of movement of through-anchor ?

Fig. 14(c)

V1 Detect longitudinal position of seat.

V2 Is it moving ?

V3 Set flag of longitudinal movement of seat.

Fig. 14(d)

W1 Detect seat back angle.

W2 Is it being changed?

W3 Set flag of change in seat back angle.

Fig. 15

~~第15図~~

15/25

start control in accomadation

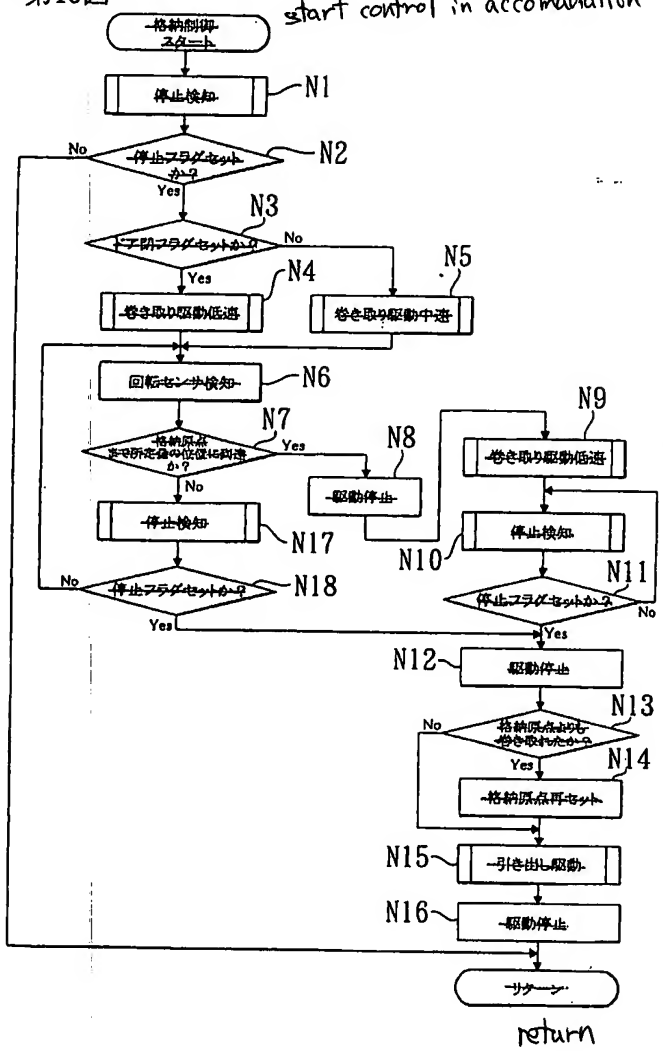


Fig. 15

N1 Detect stoppage.

N2 Is stoppage flag set ?

N3 Is flag of closing door set ?

N4 Wind at slow speed.

N5 Wind at middle speed.

N6 Detect by rotary sensor.

N7 Has it reached position of predetermined amount to accommodation origin ?

N8 Stop of drive.

N9 Wind at low speed.

N10 Detect stoppage.

N11 Is stoppage flag set ?

N12 Stop of drive.

N13 Is it wound exceeding accommodation origin ?

N14 Set accommodation origin again.

N15 Drive for drawing.

N16 Stop driving.

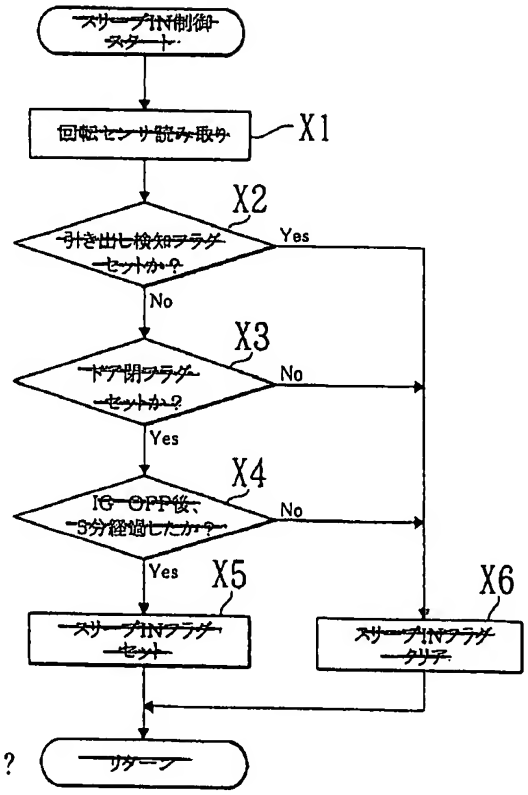
N17 Detect stoppage.

N18 Is stoppage flag set ?

Fig. 16
第16図

start controlling sleep IN

(a)



return

X1 Read out rotary sensor.

X2 Is flag of detecting drawing set ?

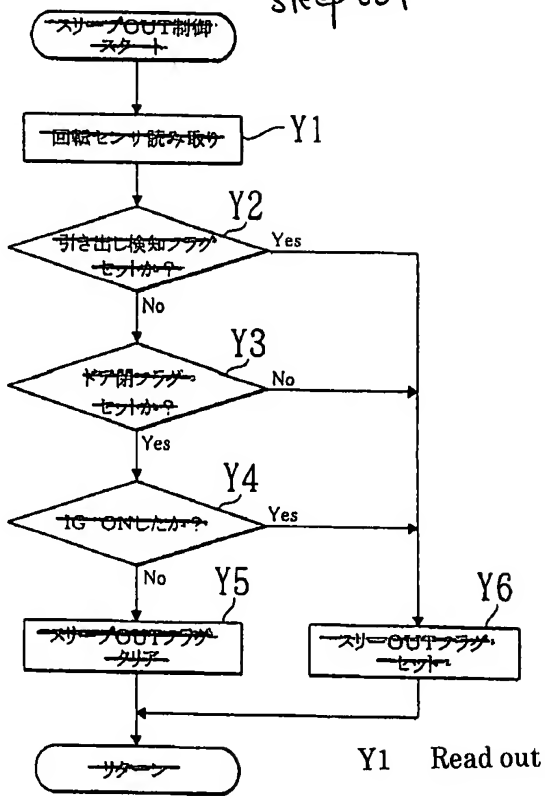
X3 Is flag of closing door set ?

X4 Has time of 5 minutes passed after OFF of IG ?

X5 Set sleep IN flag.

X6 Clear sleep IN flag.

(b) start controlling sleep out



return

Y1 Read out rotary sensor.

Y2 Is flag of detecting drawing set ?

Y3 Is flag of closing door set ?

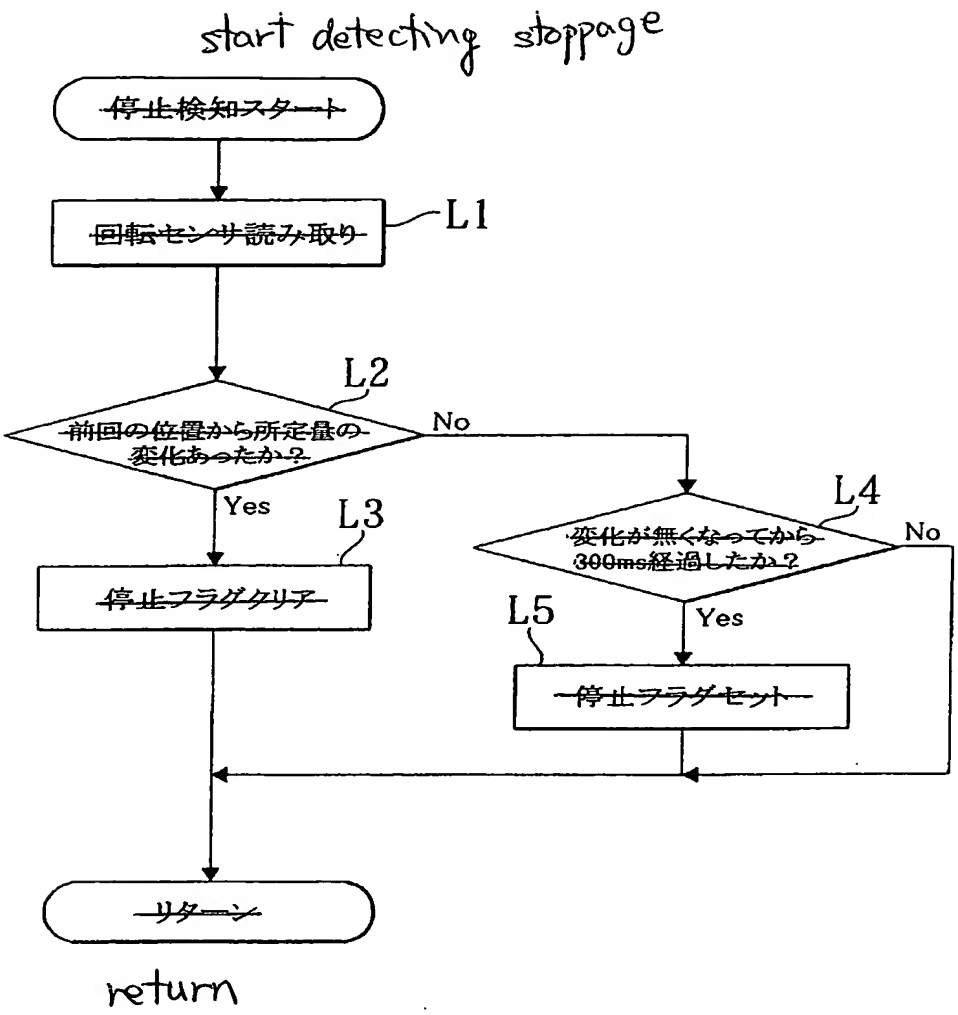
Y4 Is IG turned on ?

Y5 Clear sleep OUT flag.

Y6 Set sleep OUT flag.

Fig. 17

~~第17図~~



L1 Read out rotary sensor.

L2 Is it changed by predetermined amount from position of last time ?

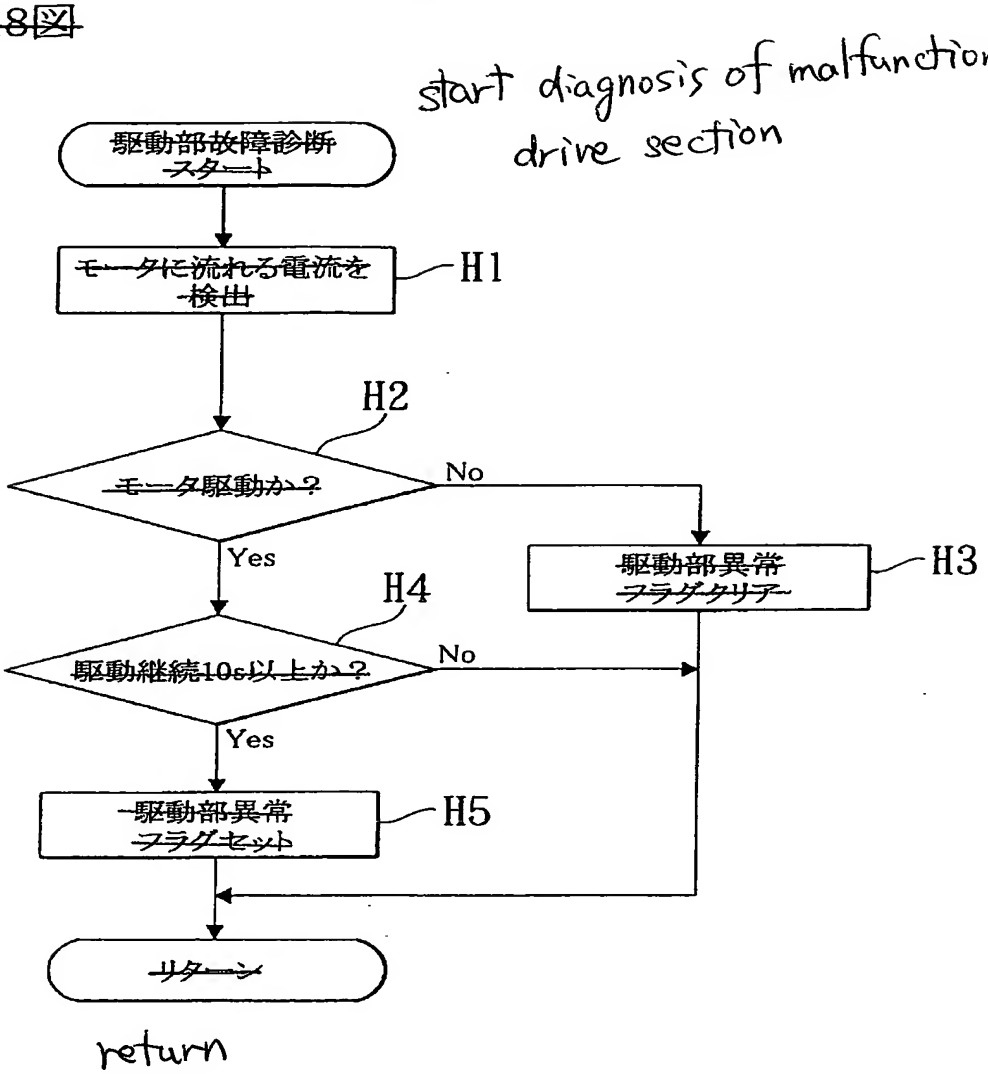
L3 Clear stoppage flag.

L4 Has time of 300 ms passed from when no change is caused ?

L5 Set stoppage flag.

Fig. 18

~~第18図~~



H1 Detect electric current flowing in motor.

H2 Is motor driven ?

H3 Clear flag of abnormality of drive section.

H4 Is drive continued not less than 10 seconds ?

H5 Set flag of abnormality of drive section.

~~第19図~~ Fig. 19

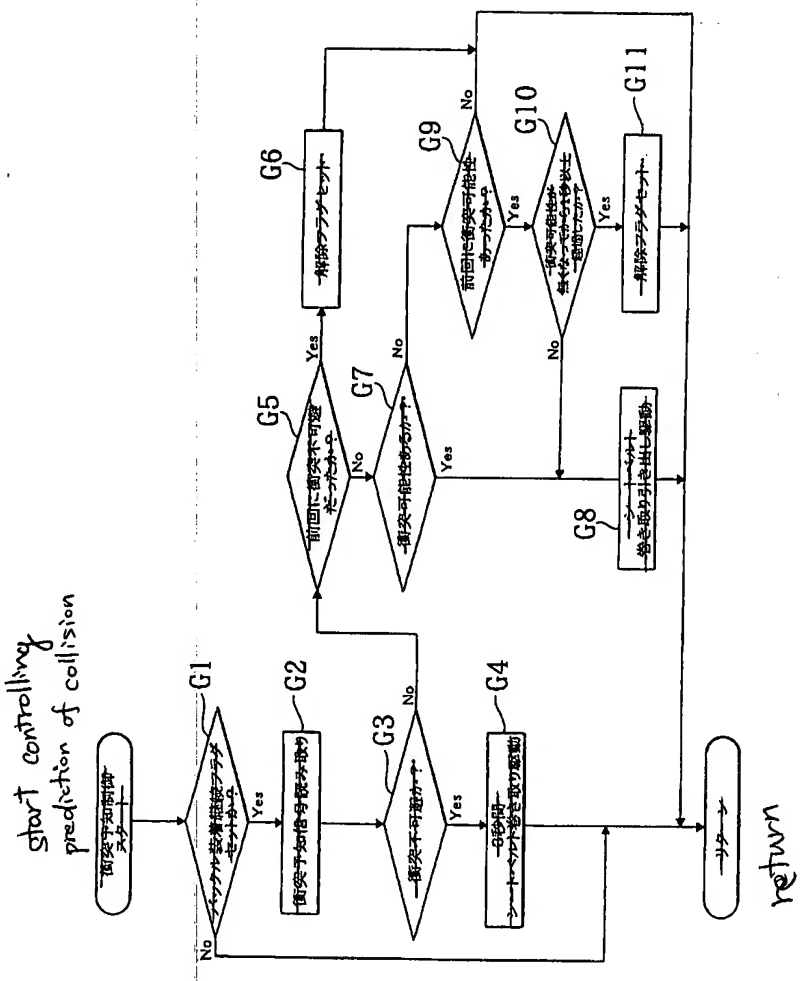


Fig. 19

G1 Is flag of continuation of fastening buckle set ?

G2 Read out signal of prediction of collision.

G3 Is it impossible to evade collision ?

G4 Wind seat belt for 3 seconds.

G5 Was it impossible to evade collision last time ?

G6 Set release flag.

G7 Is there possibility of collision ?

G8 Wind and draw out seat belt.

G9 Was there possibility of collision last time ?

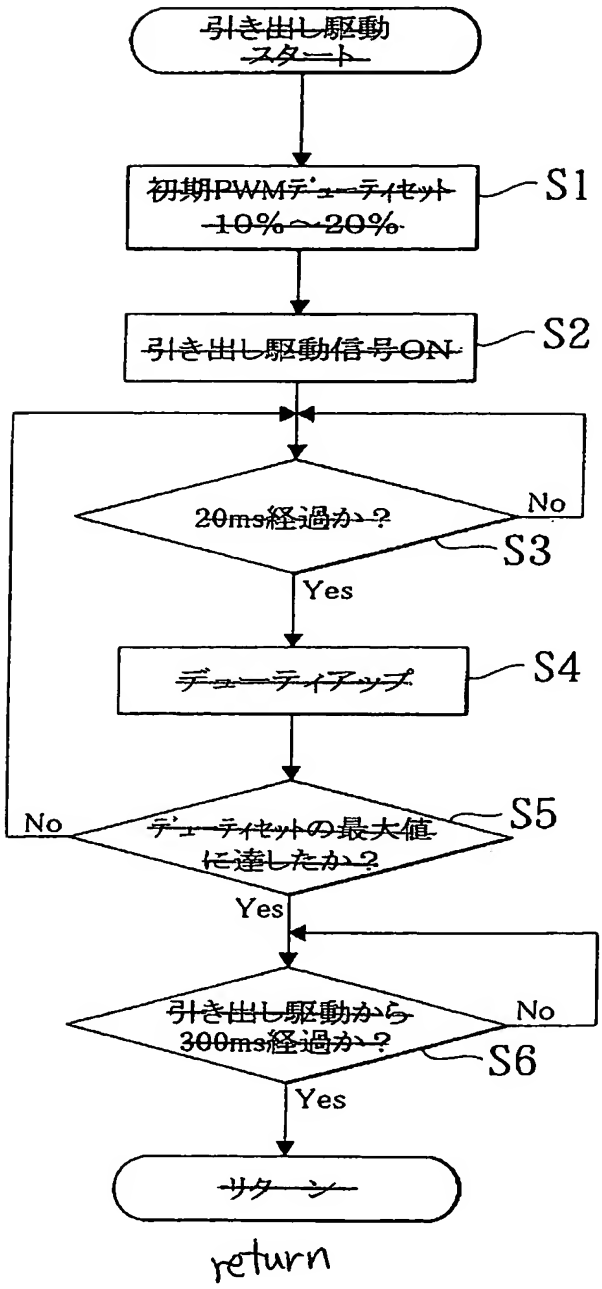
G10 Has time of 1 second or more passed after there was no possibility of collision ?

G11 Set release flag.

~~第20図~~

Fig. 20

start drawing out drive



S1 Set initial PWM duty ratio.

10% to 20%

S2 Turn on drive signal of drawing.

S3 Has time of 20 ms passed ?

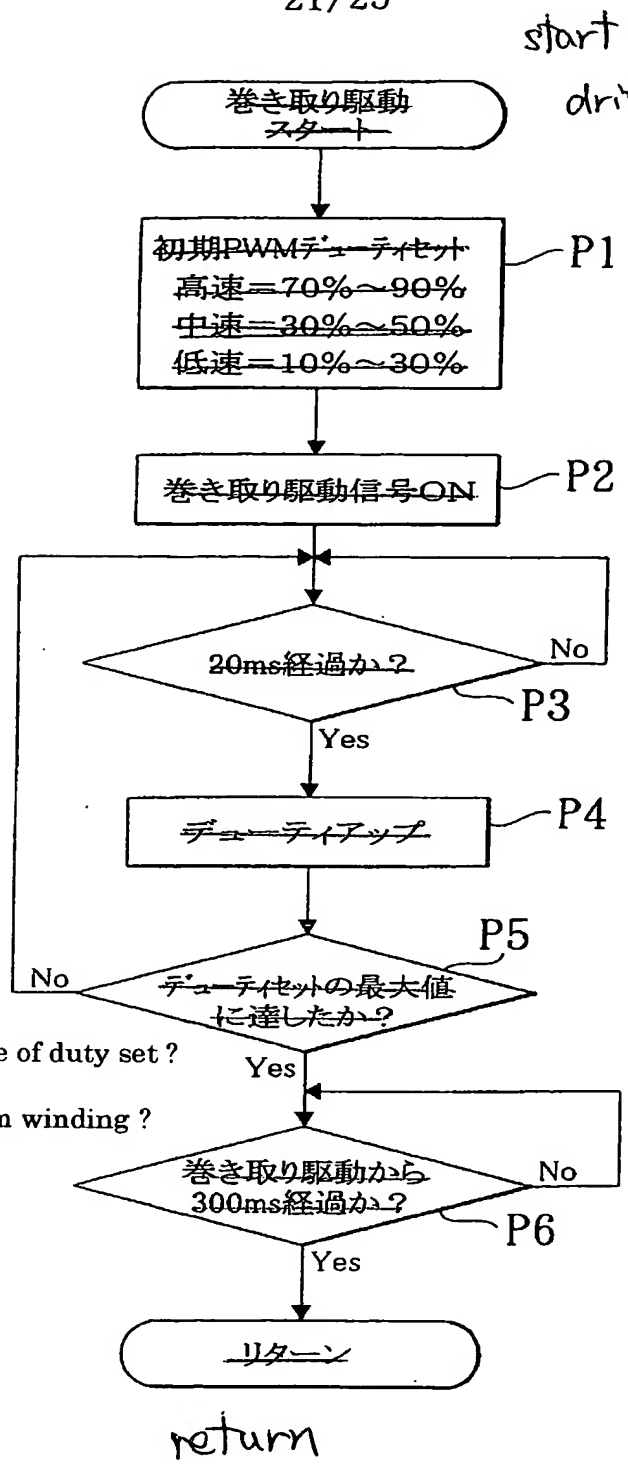
S4 Duty up.

S5 Has it reached maximum value of duty set ?

S6 Has time of 300 ms passed after drawing ?

~~第21図~~

Fig. 21



P1 Initial PWM duty set

High speed = 70% to 90%

Middle speed = 30% to 50%

Low speed = 10% to 30%

P2 Turn on signal of winding.

P3 Has time of 20 ms passed?

P4 Duty up.

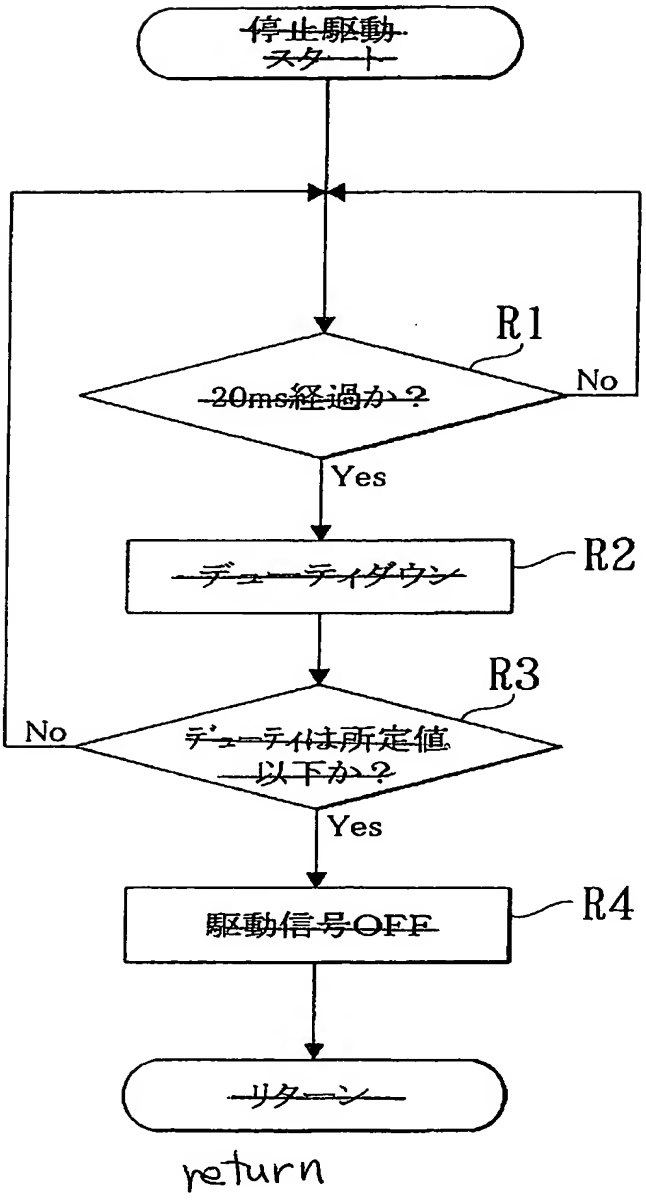
P5 Has it reached maximum value of duty set ?

P6 Has time of 300 ms passed from winding ?

~~第22図~~

Fig. 22

start stoppage drive



R1 Has time of 20 ms passed ?

R2 Duty down.

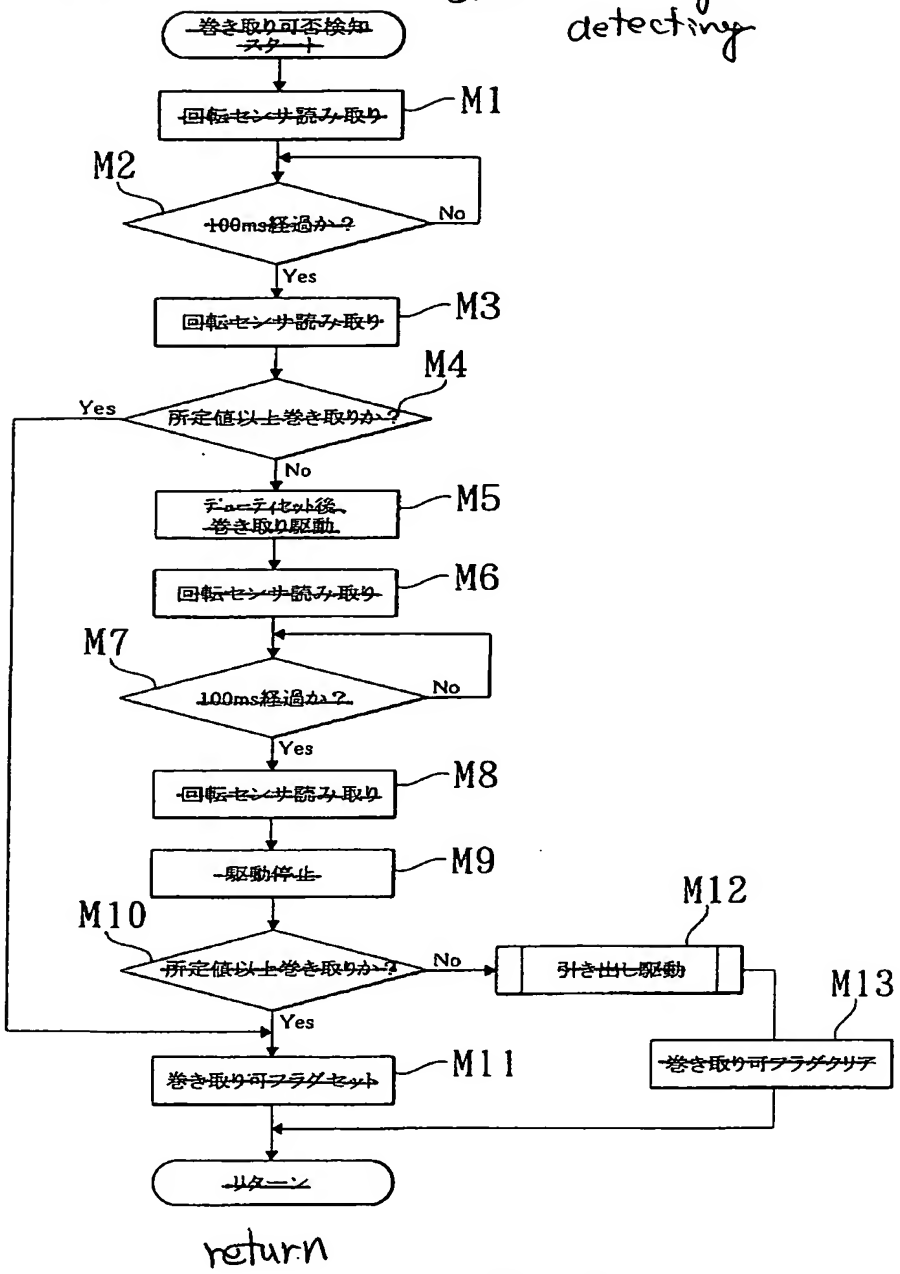
R3 Is duty predetermined value or less ?

R4 Turn off drive signal.

Fig. 23

~~第23図~~

start winding suitableness detecting



return

M1 Read out rotary sensor.

M2 Has time of 100 ms passed ?

M3 Read out rotary sensor.

M4 Is it wound exceeding predetermined value ?

M5 Wind after duty set.

M6 Read out rotary sensor.

M7 Has time of 100 ms passed ?

M8 Read out rotary sensor.

M9 Stop driving.

M10 Is it wound exceeding predetermined value ?

M11 Set flag of allowing to wind.

M12 Draw out.

M13 Clear flag of allowing to wind.

Fig. 24

~~第24図~~

C1 PWM duty set.

C2 Turn on driving signal of winding.

C3 Has predetermined period of time passed ?

C4 Detect stoppage.

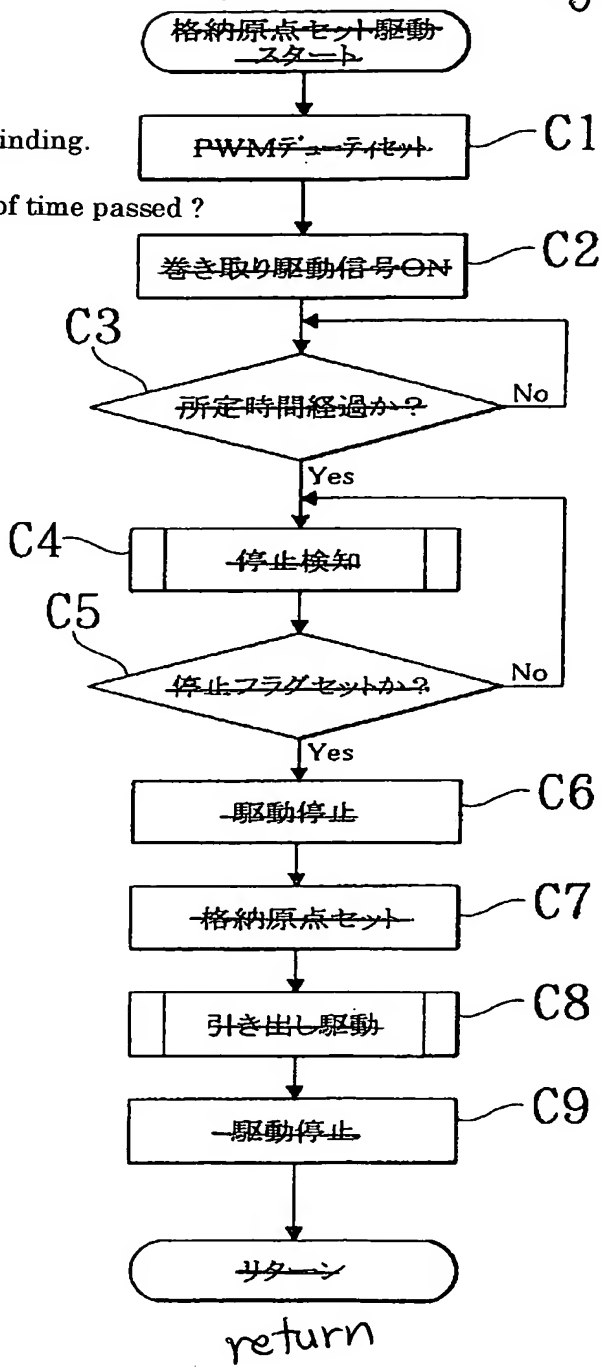
C5 Is stoppage flag set ?

C6 Stop driving.

C7 Set accommodation origin.

C8 Draw out.

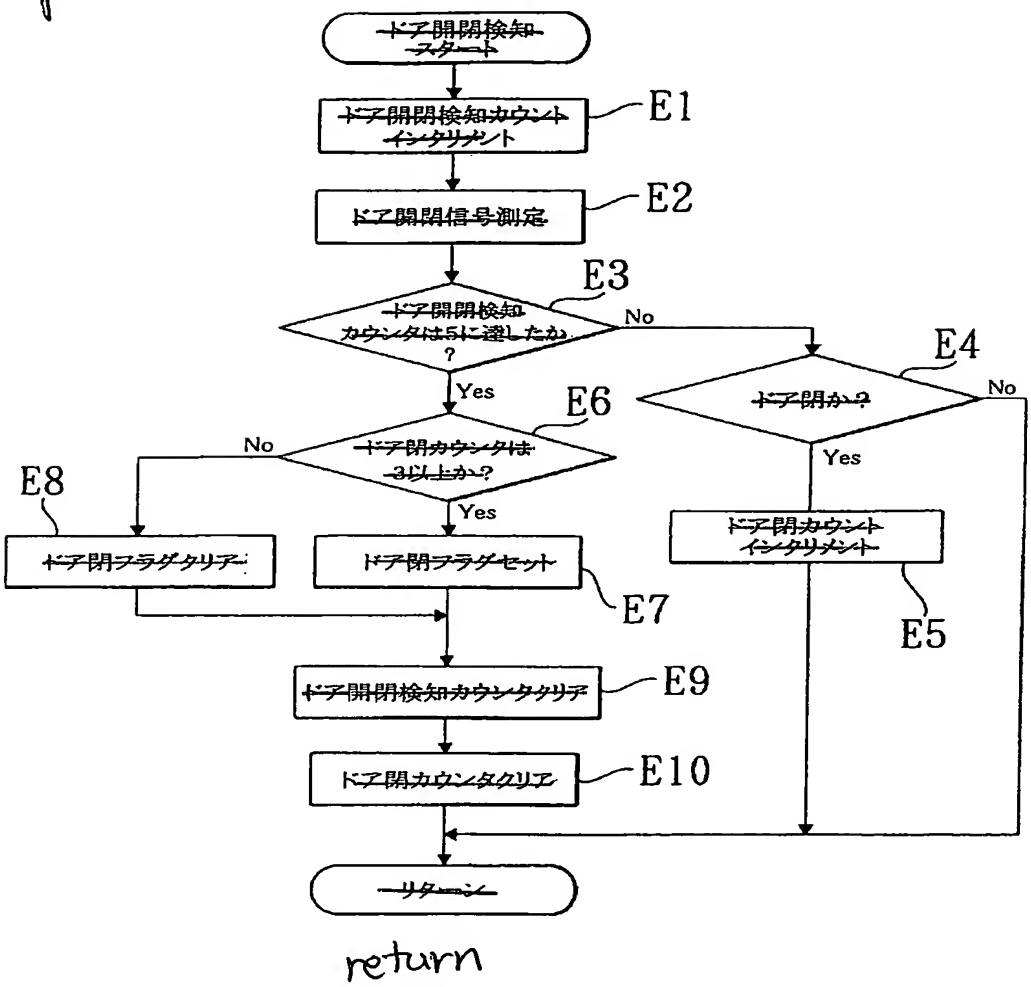
C9 Stop driving.



~~第25図~~

Fig. 25

start detecting open and close of door



return

E1 Make increment of door opening and closing detection counter.

E2 Measure opening and closing signal of door.

E3 Has door opening and closing detecting counter reached 5 ?

E4 Is door opened ?

E5 Make increment of door closing counter.

E6 Is door closing counter 3 or more ?

E7 Set door closing flag.

E8 Clear door closing flag.

E9 Clear door opening and closing detecting counter.

E10 Clear door closing counter.